Health by Numbers

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Frequency of Selected Surgical Procedures, Rhode Island, 1999 - 2002

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For some surgical procedures, research studies have determined that patients have generally better treatment outcomes where hospitals and/or surgeons perform the procedure regularly.[1] Based on this research, the Leapfrog Group and the Agency for Healthcare Research and Quality (AHRQ) have developed groups of indicators based on hospital surgical volumes, which can be used as screening tools to identify potential quality of care issues.[2, 3] Ideally, hospital-specific data on surgical volumes should be used in combination with case-mix adjusted measures of surgical outcomes, where such measures are available. For this study, the examination of surgical volumes in Rhode Island hospitals serves as an initial step in identifying potential areas for improvement in the state's overall healthcare system. Therefore, hospital surgical volumes are presented here without providing the names of individual hospitals.

Methods. Acute-care general hospitals in Rhode Island have been reporting patient-level data for every patient discharged since October 1, 1989 as required by licensure regulations. As of October 1, 1998, Rhode Island's two psychiatric specialty hospitals and one inpatient rehabilitation facility began reporting patient-level data. The data reported includes demographics and clinical data coded to the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM).[4] This analysis examines utilization during 1999-2002 of seven inpatient surgical procedures for which AHRQ believes there is strong evidence supporting a relationship between the frequency of performance of the procedure at a hospital and associated patient outcomes. AHRQ procedure definitions were used for each of the seven procedures, which include three cardiac procedures, two cancer-related procedures, and two non-cardiac vascular procedures. AHRQ cites threshold levels for the volume-outcome relationship for each procedure, above which treatment outcomes are generally better than at lower frequencies. Some procedures have upper and lower volume thresholds, reflecting a range of minimum volume thresholds in the research literature.[3] Women and Infants, Bradley, Butler and the Rehabilitation Hospital do not perform any of these seven procedures and are excluded from the analysis.

Results. Only two hospitals performed any of the three cardiac procedures between 1999 and 2002. (Table 1) Both hospitals were well above AHRQ's upper threshold for the two adult cardiac procedures, coronary artery bypass graft (CABG) and percutaneous transluminal coronary angioplasty (PTCA). Only one hospital performed any pediatric heart surgeries, with an average of 27.8 per year, which falls below the AHRQ volume threshold of 100 procedures per year.

Table 1.
Average number of cardiac procedures performed per year by hospital, Rhode Island, 1999-2002.

Cardiac Procedures			
Hospital	**Coronary Artery Bypass Graft**	**Percutaneous Transluminal Coronary Angioplasty**	**Pediatric Heart Surgery**
Hospital A	597.3	1,308.8	
Hospital B	581.8	915.5	27.8
Lower Threshold	100	200	100
Upper Threshold	200	400	

Shading: None – Meets threshold
Gray – Does not meet threshold
Black – No procedures

Eight hospitals performed one or both of the two cancer procedures between 1999 and 2002. (Table 2) The average for the five hospitals performing esophageal resection ranged from 0.3 to 1.8 per year, all below the AHRQ lower threshold of 6 procedures per year. Of the eight hospitals performing pancreatic resection, only one met either AHRQ threshold with an average of 11.3 surgeries per year. The remaining seven hospitals fell well below the AHRQ lower volume threshold of 10 procedures per year.

Table 2.
Average number of cancer procedures performed per year by hospital, Rhode Island, 1999-2002.

Cancer Surgery		
Hospital	**Esophageal Resection**	**Pancreatic Resection**
Hospital C	0.8	2.3
Hospital D	0.3	0.3
Hospital E	0.0	2.0
Hospital F	0.3	3.0
Hospital G	1.8	11.3
Hospital H	0.3	3.3
Hospital I		0.8
Hospital J		0.3
Lower Threshold	6	10
Upper Threshold	7	11

Shading: None – Meets threshold
Gray – Does not meet threshold
Black – No procedures

Ten hospitals performed both peripheral vascular system procedures between 1999 and 2002. (Table 3) While two

Table 3.
Average number of peripheral vascular system procedures performed per year by hospital, Rhode Island, 1999-2002.

Peripheral Vascular System Procedures		
Hospital	**Abdominal Aortic Aneurysm Repair**	**Carotid Endarterectomy**
Hospital K	13.5	129.5
Hospital L	11.8	41.8
Hospital M	11.5	33.3
Hospital N	40.3	115.5
Hospital O	3.5	34.0
Hospital Q	54.5	177.8
Hospital R	6.5	14.0
Hospital S	4.3	21.3
Hospital T	8.3	53.5
Hospital U	7.5	30.5
Lower Threshold	10	50
Upper Threshold	32	101

Shading: None – Meets threshold
Gray – Does not meet threshold
Black – No procedures

hospitals exceeded the upper AHRQ threshold for abdominal aortic aneurysm repair, the four-year averages for five of the ten hospitals fall below the lower threshold. The remaining three hospitals met the lower threshold but not the upper threshold. Three hospitals exceeded both the lower and upper thresholds for carotid endarterectomy, and one other exceeded the lower threshold only. Six hospitals performing this procedure did not reach either threshold.

Discussion. Among the seven surgical procedures examined, there is wide variation in the relationship of performance rates in hospitals in Rhode Island and the AHRQ volume-outcome thresholds during 1999 – 2002. All hospitals in the state performing the high-volume adult cardiac procedures, CABG and PTCA, fell above the AHRQ thresholds for those procedures. In contrast, the only hospital performing pediatric cardiac surgery fell below the AHRQ threshold. It is not known whether there is sufficient need for the pediatric procedures in the state and adjacent areas to support a program at the threshold level.

Among the cancer-related procedures and peripheral vascular procedures, the majority of programs do not meet the AHRQ frequency thresholds (either the lower or upper where there is a range of thresholds given). For the cancer-related procedures, only 32% of all such procedures were performed in hospitals whose volumes surpassed a threshold value during the year the procedure was performed; for peripheral vascular procedures, 69% of procedures were performed in high-volume hospitals. In particular, none of the hospitals performing esophageal resection and only one of the hospitals performing pancreatic resection met or surpassed AHRQ's minimum thresholds for those procedures. On a statewide basis, the total number of procedures performed indicates that this situation will likely continue unless substantial consolidation of programs occurs. For esophageal resection, as with pediatric cardiac surgery, it is questionable whether the state can support even one program at the threshold level.

Given that this analysis was performed without consideration of the actual patient outcomes of these procedures or of the procedure volumes for individual surgeons, and because there are exceptions to the general volume-outcome relationship, hospital surgical volume is not the only indicator of the quality of inpatient surgical care in specific facilities. However, the results presented here provide a statewide perspective on the volume for these surgical procedures and suggest the need to identify and evaluate possible responses in the quest for improved quality of inpatient surgical care in Rhode Island. These possible responses might include consolidation of selected surgical programs where there are multiple low-volume programs and enhanced monitoring of outcomes and processes in low-volume programs, possibly including surgeon-specific volume measures, among others.

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References.

1 Birkmeyer, JD, et al. Surgeon volume and operative mortality in the United States, NEJM 2003; 349: 2117-27.
2 The LeapFrog Group for Patient Safety. Factsheet: Evidence-Based Hospital Referral. http://www.leapfroggroup.org/FactSheets/EHR_FactSheet.PDF
3 *AHRQ Quality Indicators—Guide to Inpatient Quality Indicators: Quality of Care in Hospitals—Volume, Mortality, and Utilization*. Rockville, MD: Agency for Healthcare Research and Quality, 2002. Revision 2 (September 4, 2003). AHRQ Pub. No. 02-RO204.
4 Public Health Service and Health Care Financing Administration. *International Classification of Diseases, 9th Revision, Clinical Modification*, 6th ed. Washington: Public Health Service, 1996.

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